PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Granulated Fertiliser and process for its Granulation

We, SOCIETE ANONYME BELGE POUR LA FABRICATION DU CITRATE DE CHAUX ET DE L'ACIDE CITRIQUE, EN ABREGE: LA CITRIQUE BELGE, a Belgian Company, of Tienen, Belgium, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a granulated fertiliser based on Thomas slag.

It has not hitherto been possible to obtain a satisfactory granulated fertiliser from Thomas slag by the usual processes. In fact the fertiliser and commercial values of Thomas slag depend on its P_2O_5 content soluble in solutions of 2% citric acid. In order to obtain a fertiliser of useful commercial value and having a sufficient percentage of soluble P_2O_5 the Thomas slag must be reduced to a very finely divided state.

The powder thus obtained makes it very difficult and disagreeable for the user to apply this phosphated fertiliser.

It is an object of the present invention to overcome this drawback without reducing the fertilising qualities, of the fertiliser.

According to the present invention there is provided a granulated fertiliser based on Thomas slag containing as binding agent sugar fermentation or alcohol distillation refuse from the production of sugars from molasses.

The refuse may be derived from beet-sugar or cane-sugar molasses.

The refuse may be obtained in the manufacture from the said molasses of citric acid, gluconic acid, lactic acid or glutamic acid.

Alternatively the refuse may be obtained in the manufacture from molasses of alcohols or yeast or saccharose sugar, particularly in the form of the saccharate, by ion-exchange or by dialysis.

The various binding agents specified above are not harmful and form moreover in themselves a complete fertiliser, which adds to the fertility of the soil.

These binding agents do not alter the original properties of the slag, such as the degree of fineness after breaking down in water and the solubility of the phosphoric anhydride in a solution of citric acid.

The behaviour, of the granulated fertilisers obtained according to the invention, to atmospheric agents has been very scrupulously examined. Prolonged exposure to atmospheric factors in a permeable wrapping of jute, which reproduce exactly the same conditions of warehousing as those obtained in a farm, has shown that the granulated fertiliser did not become compacted and retained its granulated appearance. No modification was observed as regards the shape, hardness nor solubility for the phosphoric anhydride in a solution of citric acid.

The Thomas slag may be admixed with other fertiliser materials containing nitrogen or phosphorous.

The binding agent may contain a small amount of sulphuric acid or a water soluble sulphate e.g. potassium sulphate. When the binding agent comprises sulphuric acid, the quantity of this acid is by preference between 3 and 7% by weight based on the total refuse and the concentration of this acid substantially equal to 65 Baumé. When the binding agent comprises potassium sulphate, the quantity of this sulphate is by preference between 12 and 18% by weight based on the total refuse.

As regards the granulation process itself, this is very simple and is done with the aid of material generally used for this purpose, such as a vat, a plate or a granulation drum.

The addition of the binding agent is effected either by pulverisation or, with the aid of a distributing device, in free flowing thin jets.

After incorporation of binder and granulation, the fertiliser may be dried at 70—85 °C, and thereafter cooled.

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Two Examples are given below. These Examples refer to Thomas slag flour which is Thomas slag ground into fine powder.

EXAMPLE ONE

In a device of the known type for the granulation of fertilisers, 15 Kg. of refuse containing 70% of dry material from the manufacture from molasses of an organic acid is pulverised with 100 kg. of Thomas slag flour.

After sufficiently mixing the fertiliser and binding agent, granulated products are obtained which are next brought into a drying drum where these granulated products are dried to a temperature of about 80°C. Then the granulated fertiliser thereby obtained is cooled and stacked or packaged immediately.

EXAMPLE TWO

15 Kg. refuse from either the distillation of alcohol or the production of yeast, or the extraction of saccharose from molasses in which 0.750 Kg. of sulphuric acid at 65 Baumé or 2,250 Kg. of potassium sulphate, has previously been dissolved, is pulverised with 100 Kg. of Thomas slag flour, the refuse having a concentration of dry matter of 70%.

As in Example 1, the different substances are mixed, dried and then cooled.

The granulated fertiliser obtained in this way according to the invention has the advantage over the known granulated fertiliser of being little hydroscopic, non-friable and very stable.

Moreover, the binding agent used possesses the advantage over known binding agents and coating materials of being very economic, non-toxic and of having a fertilising influence.

WHAT WE CLAIM IS:—

1. A granulated fertiliser based on Thomas slag containing as binding agent sugar fermentation or alcohol distillation refuse or refuse from the production of sugars from molasses.

2. A granulated fertiliser according to Claim 1, wherein the refuse is derived from beet-sugar or cane-sugar molasses.

3. A granulated fertiliser according to Claim 2, wherein the refuse is obtained in the production from the said molasses of citric acid, gluconic acid, lactic acid or glutamic acid.

4. A granulated fertiliser according to Claim 2, wherein the refuse is obtained in the manufacture from molasses of alcohols or yeast or saccharose.

5. A granulated fertiliser according to Claim 4, wherein the refuse obtained in the extraction of saccharose from molasses is that wherein saccharose is obtained in the form of saccharate.

6. A granulated fertiliser according to Claim 4, wherein the refuse obtained in the extraction of saccharose from molasses is that wherein the saccharose is obtained by an ion-exchange process.

7. A granulated fertiliser according to Claim 4, wherein the refuse obtained in the extraction of saccharose from molasses is that wherein the saccharose is obtained by dialysis.

8. A granulated fertiliser according to any of Claims 1 to 7, wherein the refuse includes as additive sulphuric acid or a soluble sulphate, e.g. potassium sulphate.

9. A granulated fertiliser according to Claim 8, wherein when the additive is constituted by sulphuric acid, the concentration of the latter is substantially equal to 65 Baumé, the quantity of this additive, being between 3 and 7% by weight of the quantity of the total refuse.

10. A granulated fertiliser according to Claim 8, wherein when the additive is constituted by potassium sulphate, the quantity of the latter is between 12 and 18% by weight of the quantity of the total refuse.

11. A process for preparing a granulated fertiliser based on Thomas slag, wherein Thomas slag is treated with a binding agent consisting of a sugar fermentation or alcohol distillation refuse or a refuse from the production of sugar from molasses.

12. A process according to Claim 11 wherein the binding agent contains 65 — 85% of dry material and the total binding agent is employed in an amount of 12 — 18% based on the fertiliser material (other than binding agent).

13. A process according to Claim 11 or 12, wherein sulphuric acid or a water-soluble sulphate is previosuly dissolved in the binding agent before mixing the latter with the fertiliser to be granulated.

14. A process according to any of Claims 11 to 13, wherein the binding agent is added to the fertiliser by pulverisation.

15. A process according to any of Claims 11 to 13, wherein the binding agent is added to the fertiliser in the form of freely flowing thin jets.

16. A process according to any one of Claims 11 to 15, wherein the fertiliser is dried after it has been granulated at a temperature of between 70 and 85°C, after which it is cooled.

17. A process for preparing granulated fertilisers based on Thomas slag substantially as herein described.

18. A granulated fertiliser substantially as hereinbefore described with reference to any one of the Examples.

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